

REMARKS

Priority

The Examiner acknowledges the receipt of the papers submitted under 35 U.S.C. §119 (a)-(d).

Information Disclosure Statement

Information in the IDS filed December 5, 2001 has been considered and placed in the file.

Drawings

The drawings submitted December 5, 2001 have been accepted.

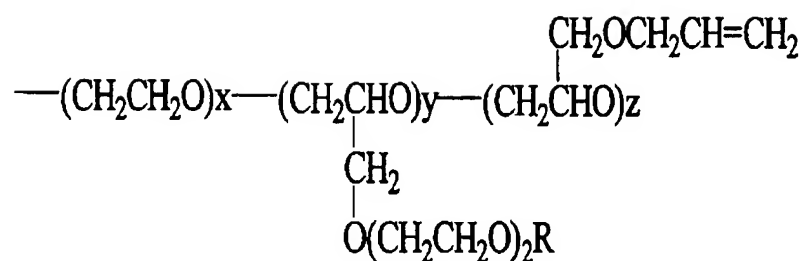
Rejection under 35 U.S.C. §103

A. Claims 1, 2, 5, 7, 10, 11, 21 and 23 are rejected under 35 U.S.C. §103(a) as being unpatentable over JP 11-039940 A (JP '940).

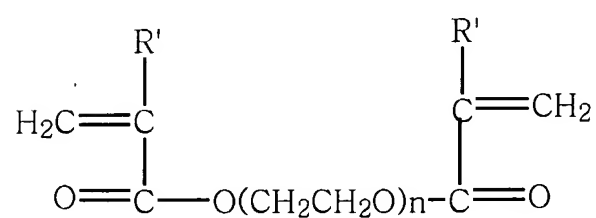
Claim 23 has been amended for clarity.

It is respectfully submitted that there is a misunderstanding of what is taught by JP '940. JP '940 teaches a method of manufacturing a solid polymer-electrolyte thin film (paragraph 5) in which a polyether polymer (Formula A) is dissolved in a suitable organic solvent together with an electrolyte salt compound to permit a reactive portion (R2- a crosslinking portion) of the polyether polymer to crosslink within the polyether polymer, and the solvent is removed to form a macromolecule thin film on a desired base material.

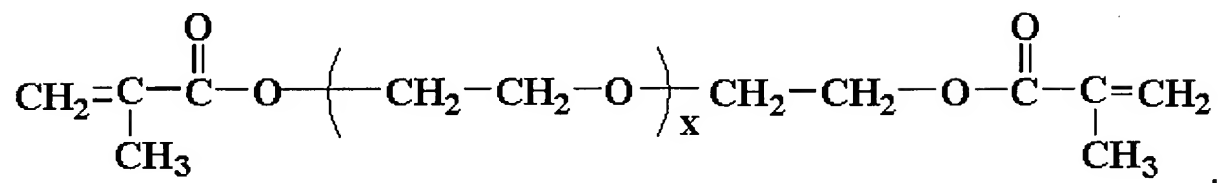
In contrast, the independent claims (claim 1, 7, 10, 17 and 23) of the present invention teach polymerizing a polymer electrolyte precursor that comprises a polymer of formula 1:



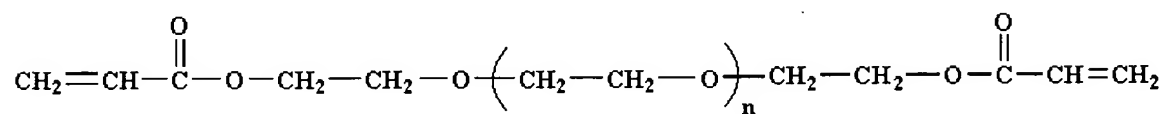
with a crosslinking agent (formula 2):



such as, for example, polyethylene glycol dimethacrylate:



polyethylene glycol diacrylate:



or the like (see paragraph 26 of the specification), and an electrolytic solution composed of a lithium salt and a non-aqueous organic solvent (see claim 1 for ranges of constituent groups). Crosslinking is defined as establishing of chemical links between the molecular chains in polymers. Crosslinking differs from catalysis, in which a substance affects a rate of a reaction without itself being consumed or undergoing a chemical change. In crosslinking, **the crosslinking agent (formula 2) participates in the reaction by forming a chemical link between molecular chains in the polymer (formula 1)**. Thus, the chemical structure of the polymer electrolyte precursor formed by the present invention is significantly different from the structure of formula 1 because the chemical structure of the polymer electrolyte precursor of the present invention is a networked structure of formula 1 and formula 2.

In contrast, the structure of JP '940 is simply a polymerized version of Formula A in the presence of an electrolyte salt compound in an organic solvent which is then applied to a base material so that the solvent may be removed to leave a thin film of the polymerized version of Formula A. That is, no further compound is introduced into the polymer structure, i.e., the chemical reactions are different and the products are different when JP'940 and the present invention are compared: In the present invention, the polymeric gel electrolyte is prepared by polymerizing a polymer (formula 1) with a crosslinking agent (formula 2) in an electrolytic solution of a lithium salt and a non-aqueous organic solvent to form a chemically linked polymer. Thus, the chemical structure of the polymer gel electrolyte of the present invention is different from the chemical structure of the macromolecular solid electrolytic thin film of JP '940.

Also, although the Examiner recites that paragraph 12 of JP '940 recites a crosslinking agent, paragraph 12 of JP'940 recites only epoxy-group content monomers which may be "set in a polyether polymer" (paragraph 10) to aid in crosslinking within the polymer itself. The present invention does not include epoxy-group monomers.

Also, while starting materials, Formula A of JP '940 and formula 1 of the present invention may appear to be somewhat similar, it should be noted that the mol ratio of m of JP '940 is 0.5-0.95, while the mol ratio of x of the present invention is 0.1-0.6, showing a possible large variation in the amount of each component.

There is no teaching or suggestion in JP '940 to utilize a chemical crosslinking agent as is taught in claims 1, 7, 10, 17 and 23 of the present invention. Thus, it is respectfully submitted that claims 1, 7, 10, 17 and 23 are allowable under 35 U.S.C. §103(a) and are patentable over JP 11-039940 A (JP '940).

Since claims 2, 5, 11, 14, and 21 depend from independent claims 1, 7, and 10, respectively, claims 2, 5, 11, 14 and 21 are submitted to be allowable under 35 U.S.C. §103(a) and are patentable over JP 11-039940 A (JP '940) for at least the reasons that claims 1, 7 and 10 are submitted to be allowable.

B. Claims 3, 4, 8, 12, 13 and 18 are rejected under 35 U.S.C. §103(a) as being unpatentable over JP 11-039940 A (JP '940) as applied to claims 1, 7, 10, 17 and 23 above in view of USPN 6,180,287 (Watanabe) or USPN 6,159,389 (Miura).

The teachings of JP '940 are discussed above. Both Watanabe and Miura et al. teach reacting of a compound having an epoxy group which is not of formula 1 and optionally using a crosslinking agent. Also, there is no teaching or suggestion of combining Watanabe and/or Miura et al., and even if combined, said references would not teach the present invention.

Thus, although a N,N-(1,4-phenylene)bismaleimide cross-linking agent is utilized in Watanabe or Miura et al., there is no teaching or suggestion of combining Watanabe and/or Miura et al. with JP'940 to obtain the present invention, and since the chemical reaction of JP '940 is different from the chemical reaction of the present invention, even if such references were combined, they would not teach the present invention.

Since the present invention does not teach reaction of a compound having an epoxy group, it is respectfully submitted that claims 1, 7, 10 and 17 are allowable under 35 U.S.C. §103(a) and are patentable over JP 11-039940 A (JP '940) above in view of USPN 6,180,287 (Watanabe) or USPN 6,159,389 (Miura et al.). Since claims 3, 4, 8, 12, 13, and 18 depend from independent claims 1, 7, 10 and 17, respectively, it is respectfully submitted that claims 3, 4, 8, 12, 13 and 18 are allowable under 35 U.S.C. §103(a) and are patentable over JP 11-039940 A (JP '940) as applied to claims 1, 7, 10, 17 and 23 above in view of USPN 6,180,287 (Watanabe) or USPN 6,159,389 (Miura) for at least the reasons that claims 1, 7, 10 and 17 are submitted to be allowable.

C. Claims 6 and 15 are rejected under 35 U.S.C. §103(a) as being unpatentable over JP 11-039940 A (JP '940) as applied to claims 1, 7, 10 17 and 23 above in view of USPN 6,114,068 (Yamada et al.).

The teachings of JP '940 are discussed above. In addition, JP '940 teaches a range of weight ratios of the polyether polymer to electrolyte. However, as described above, the chemical reaction of JP '940 is different from the chemical reaction of the present invention (see independent claims 1 and 1 and 10). It is respectfully submitted that although Yamada et al. teaches utilizing different weight ratios of polymer to electrolyte, Yamada et al. also fails to teach chemically crosslinking a substance of formula 1 using a substance of formula 2. Hence, neither JP '940 nor Yamada et al. teaches chemically crosslinking a substance of formula 1 using a substance of formula 2.

Thus, it is respectfully submitted that independent claims 1 and 10 are allowable under 35 U.S.C. §103(a) and are patentable over JP 11-039940 A (JP '940) above in view of USPN 6,114,068 (Yamada et al.). Since claims 6 and 15 depend from claims 1 and 10, claims 6 and 15 are submitted to be allowable under 35 U.S.C. §103(a) and patentable over JP 11-039940 A (JP '940) as applied to claims 1, 7, 10 17 and 23 above in view of USPN 6,114,068 (Yamada et al.). for at least the reasons that claims 1 and 10 are submitted to be allowable.

D. Claims 9 and 19 are rejected under 35 U.S.C. §103(a) as being unpatentable over JP 11-039940 A (JP '940) as applied to claims 1, 7, 10, 17 and 23 above in view of EP 0838487 A2 (EP '487).

The teachings of JP '940 are discussed above. As described above, the chemical reaction of JP '940 is different from the chemical reaction of the present invention (see independent claims 1 and 10).

It is respectfully submitted that EP '487 teaches a polyether copolymer having an epoxy crosslinking component and states "the crosslinking reaction is normally completed at the temperature of 10 to 150°C." However, since the chemical reaction of JP'940 is different from the chemical reaction of the present invention, it is respectfully submitted that there is no teaching or suggestion of combining JP'940 and EP'487, and that independent claims 7 and 17 are allowable under 35 U.S.C. §103(a) and are patentable over JP 11-039940 A (JP '940) in view of EP 0838487 A2 (EP '487). Hence, claims 9 and 9, which depend from claims 7 and 17,

are submitted to be allowable under 35 U.S.C. §103(a) and patentable over JP 11-039940 A (JP '940) as applied to claims 1, 7, 10, 17 and 23 above in view of EP 0838487 A2 (EP '487) for at least the reasons that claims 7 and 17 are submitted to be allowable.

E. Claims 16, 20, and 24 are rejected under 35 U.S.C. §103(a) as being unpatentable over JP 11-039940 A (JP '940) as applied to claims 7, 10 and 23 above in view of USPN 5,641,565 (Sogo).

The teachings of JP '940 are discussed above. As described above, the chemical reaction of JP '940 is different from the chemical reaction of the present invention (see independent claims 1 and 10).

It is respectfully submitted that Sogo teaches a polyethylene/polypropylene separator for an organic electrolytic solution. It is respectfully submitted that the courts have held that the Examiner may not suggest modifying references using the present invention as a template absent a suggestion of the desirability of the modification in the prior art. *In re Fitch*, 23 U.S.P.Q.2d 1780, Fed Cir. 1992. Something in the prior art as a whole must suggest the desirability, and thus, the obviousness, of making the combination. *Alco Standard Corp. v. Tennessee Valley Authority*, 808 F. 2d 1490, 1 U.S.P.Q. 2d 1337 (Fed. Cir. 1986). When a rejection depends on a combination of prior art references, there must be some teaching, suggestion or motivation to combine the references. *In re Geiger*, 815 F.2d 686, 688 2 U.S.P.Q.2d 1276, 1278 (Fed. Cir. 1987). Since there is no teaching or suggestion of combining Sogo with JP '940, and even if combined, they would not teach the present invention (since JP '940 has a different chemical reaction and thus a different chemical product than the present invention), it is respectfully submitted that independent claims 7, 10 and 23 are allowable under 35 U.S.C. §103(a) and are patentable over JP 11-039940 A (JP '940) in view of USPN 5,641,565 (Sogo). Since claims 16, 20 and 24 depend from claims 10, 7 and 23, respectively, claims 16, 20 and 24 are submitted to be allowable under 35 U.S.C. §103(a) over JP 11-039940 A (JP '940) as applied to claims 7, 10 and 23 above in view of USPN 5,641,565 (Sogo) for at least the reasons that claims 10, 7 and 23 are submitted to be allowable.

F. Claim 22 is rejected under 35 U.S.C. §103(a) as being unpatentable over JP 11-039940 A (JP '940) as applied to claim 7 above in view of Miura.

The teachings of JP '940 are discussed above. As described above, the chemical reaction of JP '940 is different from the chemical reaction of the present invention (see independent claims 1 and 10).

It is respectfully submitted that it is described above why claim 7 is allowable under 35 U.S.C. §103(a) and is patentable over JP 11-039940 A (JP '940) in view of Miura et al. Since claim 22 depends from claim 7, claim 22 is submitted to be allowable under 35 U.S.C. §103(a) and patentable over JP 11-039940 A (JP '940) in view of Miura et al. for at least the reasons that claim 7 is submitted to be allowable.

Rejection under Judicially Created Doctrine of Obviousness-type Double Patenting

A. Claims 1-15, 17-20 and 22-23 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims of USPN 6,632,571 (Noh).

Since claims 1-15, 17-20 and 22-23 of the present invention are not yet in final form, it is respectfully submitted that it is premature to execute a terminal disclaimer. Upon allowance of the claims except for a double patenting rejection, if the claims of the present invention are still held to be unpatentable over claims of USPN 6,632,571 (Noh), it is respectfully submitted that, at that time, consideration of filing a terminal disclaimer would be appropriate.

B. Claim 16 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-48 of USPN 6,632,571 (Noh) as applied to claim 10 above and in further view of USPN 5,579,659 (Morigaki) or Sogo.

Since claim 16 of the present invention is not yet in final form, it is respectfully submitted that it is premature to execute a terminal disclaimer. Upon allowance of the claims except for a double patenting rejection, if claim 16 of the present invention is still held to be unpatentable over claims 1-48 of USPN 6,632,571 (Noh) as applied to claim 10 above and in further view of USPN 5,579,659 (Morigaki) or Sogo, it is respectfully submitted that, at that time, consideration of filing a terminal disclaimer would be appropriate.

C. Claim 21 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-48 of USPN 6,632,571 (Noh) as applied to claim 7 above and in further view of JP '940.

Since claim 21 of the present invention is not yet in final form, it is respectfully submitted that it is premature to execute a terminal disclaimer. Upon allowance of the claims except for a double patenting rejection, if claim 21 of the present invention is still held to be unpatentable over claims 1-48 of USPN 6,632,571 (Noh) as applied to claim 7 above and in further view of JP '940, it is respectfully submitted that, at that time, consideration of filing a terminal disclaimer would be appropriate.

Conclusion

In accordance with the foregoing, no claims have been amended or cancelled. Claims 1-24 are pending and under consideration.

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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